Cartesian Equation (Explicit function)

Rule

1)Symmetry

i) If all even power's of 'x' then curve is symmetric about y-axis
ii) If all even power's of 'y' then curve is symmetric about x-axis
iii) All even power's of x and y then curve is symmetric about both axis.
iv) Replace (x,y)by(-x,-y) and equation temains same then curve is symmetric about opposite quadrant's.
v) Replace (x,y) by (y,x) and equation remains same then curve is symmetric about line y=x.
vi) Replace (x,y) by (-y,-x) and equation remains same, then curve is symmetric about line y=-x.

2)Point of intersection

i) put x=0 to find the intersection with y-axis.
ii) put y=0 to find the intersection with x-axis.

3)Tangents

i) Tangent at origin

If (0,0) satisfies the equation the put lowest degree term equal to zero, to find tangent at origin.

ii) Nature of tangent at any point 'p'.

$$\left(\frac{dy}{dx}\right)_p = 0\,, then\ tangent\ is\ parallel\ to\ x-axis$$

$$iii)\left(\frac{dy}{dx}\right)_p = \infty\,, then\ tangent\ is\ parallel\ to\ y-axis$$

iv) $\left(\frac{dy}{dx}\right)_p = +ve,$

$then\ tangent\ makes\ acute\ angle\ with\ x-axis.$

v) $\left(\frac{dy}{dx}\right)_p = -ve,$

$then\ tangent\ makes\ obtuse\ angle\ with\ x\ axis.$

4)Asymptotes:-

Asymptotes are tangents to the curve at infinity.

i) Asymptotes parallel to y-axis

Equate coefficient of highest degree term in y=0.

ii) Asymptotes parallel to x-axis

Equate coefficient of highest degree term in x=0.

iii) Oblique Asymptotes

Asymptotes which are not parallel to x-axis or y-axis .

5)Region of absence

i)For curve y=f(x) if y is become imaginary for some x>a then curve is absent in that region.

ii)For curve y=f(y) if y is become imaginary for some y>a then curve is absent in that region

Polar curve(R=f(θ))

Rule

1)Symmetry

i) Change θ by –θ and equation remains unchanged then curve is symmetric about initial line.

ii) Change r by –r and equation remains unchanged then curve is symmetric about pole.

iii) Change θ by –θ and Change r by –r equation remains unchanged then curve is symmetric about y-axis.

iv) Change θ by π–θ and equation remains unchanged then curve is symmetric about y-axis.

1)Intersection

If for some ‘θ’ r=0 then curve passing through pole.

2)**Tangents**

Put r=0, then values of ‘θ’ gives tangent at pole.

i) Find the value of ‘r’ for different value of ‘θ’.

ii) Angle between radius vector and tangent is denoted by (Ø)

$$\tan \emptyset = r \frac{d\theta}{dr}$$